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Environmental
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Examen des évaluations
environnementales

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Publications

GUIDELINES
for preparation of an
ENVIRONMENTAL IMPACT STATEMENT
FOR
EASTERN ARCTIC OFFSHORE EXPLORATORY DRILLING



JANUARY 1978

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TABLE OF CONTENTS

1.0	INTRODUCTION -----	1
2.0	SCOPE -----	3
3.0	DEFINITION OF TERMS -----	3
4.0	OVERVIEW SUMMARY -----	5
5.0	THE PROJECT SETTING -----	5
5.1	Declaration and Objective -----	5
5.2	The Need -----	6
5.3	Alternatives -----	6
5.4	Associated Projects -----	7
6.0	THE PROPOSAL -----	7
6.1	General Layout -----	7
6.2	Construction Details -----	8
6.3	Operation and Maintenance -----	9
6.4	Environmental Hazard Prediction Systems -----	11
6.5	Abandonment -----	11
7.0	DESCRIPTION OF EXISTING ENVIRONMENT AND RESOURCE USE -----	11
7.1	Climate and Sea Ice -----	13
7.2	Oceanography -----	14
7.3	Terrain -----	15
7.4	Flora and Fauna -----	15
7.5	People -----	17
7.6	Resource Use -----	17
8.0	ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES -----	18
8.1	General -----	18
8.2	Contingency Plans and Countermeasures -----	19
9.0	RESIDUAL IMPACTS -----	21
10.0	APPENDICES -----	21



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1.0 INTRODUCTION

The Environmental Assessment and Review Policy of the Government of Canada requires that proposed projects initiated or funded by the federal government or with federal lands involved, and which are likely to have significant adverse environmental effects, be submitted to an Environmental Assessment Panel for review prior to the issuance of the necessary authorities to proceed. The Panel, formed under the aegis of the Minister of the Environment, reviews an Environmental Impact Statement (EIS) which is prepared by or for the Proponent(s) of the project, and is submitted by an Initiator department.

These guidelines have been prepared in order that the environmental impact of exploratory drilling for gas and oil in the Canadian Eastern Arctic offshore area can be determined. The Initiator for this project is the Department of Indian and Northern Affairs and the proponent(s) are the various oil companies proposing to drill in the area. The Scope of the Project, for which these guidelines detail the EIS information requirements, is more precisely defined in Section 2.0.

The definition of these and other terms used in this document is presented in more detail in Section 3.0. These guidelines have been contributed to by the Environmental Assessment Panel, and the Department of Fisheries and the Environment.

The Initiator and Proponent(s) are expected to observe the intent rather than the letter of the guidelines and to make every effort to identify and describe all environmental impacts likely to arise from the

Project, even for those situations not explicitly identified in these guidelines. Any changes or major deviations from these guidelines are to be approved by the Environmental Assessment Panel prior to implementation of the change or major deviation. Should the Proponent or Initiator wish to execute the EIS in phases, such phasing should be discussed and approved by the Environmental Assessment Panel. The objective of the EIS for offshore exploratory drilling should be to determine those areas where, from an environmental point of view, a) drilling can proceed and under what conditions, b) drilling cannot proceed, and c) insufficient data exists on which to base a decision.

Sections 4.0 through 10.0 outline the content of the EIS the Panel wishes to receive. Section 4.0 calls for an Overview Summary, suitable for review by executives, the media and the public. It will capture in brief the possible environmental impacts of the Project and the efforts that will be made to identify and quantify, avoid and mitigate them. Sections 5.0 and 6.0 outline the basic information requirements for the Project itself, from initiation to abandonment. Section 7.0 outlines existing environmental features including current use of resources. Section 8.0 calls for the identification of likely environmental impacts resulting from the interaction of the Project activities as described in Sections 5.0 and 6.0 on the environmental features as described in Section 7.0 in addition to contingency planning. Measures proposed to avoid, mitigate or counteract the undesirable consequences, or to enhance desirable effects are to be discussed in Section 8. Section 9.0 requires the identification, and quantification where possible, of residual impacts remaining after all mitigating measures have been taken. An assessment should be made of their

significance and of any information deficiencies that may affect the validity of the EIS. The Appendices, Section 10.0, outline references, data, and source information used to support the development and preparation of the EIS.

2.0 SCOPE

These guidelines are intended to apply to the entire Project, including the exploration systems and associated works. All major alternatives that have received active consideration are considered to be parts of the Project. Construction and operational support activities and facilities (such as temporary work camps, storage areas and transport and communication systems) are also considered to be parts of the Project.

3.0 DEFINITION OF TERMS

The following terms used in this document bear definition:

Associated Projects

- construction, transportation and similar projects that will be required or will follow as a direct result of the initiation of the Project.

Environmental Assessment Panel (Panel)

- a group of experts appointed to review an Environmental Impact Statement and advise the Minister of the Environment.

Environmental Impact Statement (EIS)

- a documented assessment of the environmental consequences of an intended project, or group of projects, which may have significant environmental consequences. The EIS is completed early in the planning stages of development in accordance with guidelines established by the Panel for that undertaking.

Initiator

- a federal department or agency which intends to undertake or sponsor a project, or group of projects, having possible environmental effects and which is thereby required to take appropriate action according to the Environmental Assessment and Review Process.

Project

- all activities directly associated with the exploratory drilling for oil and gas in the Canadian Eastern Arctic waters which could be affected by this project, such as Baffin Bay, Davis Strait, Hudson Strait, Ungava Bay. It includes all works, facilities, services and activities required to construct and operate the system and all major alternatives that have received active consideration.

Project Area

- includes all areas, both permanent and temporary, for the construction and operation of the Project, such as that for the exploratory drilling sites, on shore equipment and material storage areas, harbours, docks, airfields, helicopter pads, roads, construction camps, water supply areas, waste disposal areas, fuel storage areas and such undefined contiguous areas as may reasonably be considered to be subject to impact from Project activities.

Proponent(s)

- a company, or other organization outside the federal government which intends to undertake a project, or group of projects, within the scope of the Environmental Assessment and Review Process, having possible environmental effects.

Major Environmental Impact

- those long and short-term environmental impacts that enhance, disrupt, impair or destroy existing features, conditions or processes in the natural environment; or which cause enhancement of, or conflict with, established, traditional or historic land use and ways of life; or that affect the livelihood or health of segments of the human population (deleterious as well as beneficial effects); or which significantly change the environmental options.

4.0 OVERVIEW SUMMARY

The Overview Summary will consolidate the important findings of the report and will be written in such a manner as to allow reviewers to focus immediately on items of concern. It should be written in terms understandable to the general public including translation and in a format that allows it to be extracted directly for publication by the media, or for use by senior executives requiring a quick appraisal of the situation.

The Summary must be published separately as well as being included in the EIS and must briefly describe the Project, the possible major environmental impacts, the avoidance and/or mitigating measures to be implemented, and the significance of any residual environmental impacts. Aspects of the development which might stimulate public concern should be described with particular clarity. The Summary must also clearly identify data gaps or knowledge deficiencies, and the limitations these impose on the Environmental Impact Statement.

5.0 THE PROJECT SETTING

5.1 Declaration and Objective

The Proponent(s) and Initiator of the Project must be identified

and must assume full responsibility for statements and judgements appearing in the Environmental Impact Statement.

If the project has more than one Proponent, the responsibilities of each must be clearly identified. The Proponents of Associated Projects, upon which this Project depends, should also be identified.

The objective of the project should be clearly stated, in terms of environmental parameters.

5.2 The Need

This section should convey the primary purpose of the proposed project and how the proposed action fits into federal or other requirements. The Initiator should provide evidence of the oil or gas demand for the proposed development. The timing of the project should be outlined with respect to this expected demand. Forecast curves reflecting existing and historic oil and gas demands and the location of these demands should also be outlined. The principle purpose of this section is to indicate the economic perspective against which potential environmental impacts may be judged.

5.3 Alternatives

Briefly review the major drilling methods, timing, logistic, and alternatives considered while selecting the alternative for which this Environmental Impact Statement is prepared and describe the basis on which each alternative was rejected in favor of the selected alternative. Describe the significant differences in environmental impacts among the alternatives considered. The reviewer must be in a position to comparatively evaluate the costs, benefits and environmental risks of each of the alternatives considered.

Extension of existing facilities where they exist and cancellation of the development or activity should be considered as alternatives.

5.4 Associated Projects

The Initiator should identify all associated projects that may be affected by the proposal and which in turn may cause environmental concern. Discuss the interrelationships of such associated projects and the environmental concerns identified whether or not these concerns fall within the jurisdiction of the proponent and/or Initiator.

The Initiator should also generally discuss in terms of their environmental effects the long-term, probable developments or activities resulting from the proposal.

6.0 THE PROPOSAL

The major alternatives that have been considered should be discussed under each of the headings below. Factors common to all alternatives should be discussed first, followed by a description of those unique to individual alternatives.

The Project plans must conform to existing regulations, guidelines and laws, which may be identified by referring to the appropriate agencies. The proponent should also demonstrate that consultations have been held with appropriate planning authorities.

6.1 General Layout

The Proponent(s) should provide a suitable small scale map showing the location of major Project facilities in relation to easily recognizable geographic features and human settlements within the Project area.

In addition, the Proponent(s) should provide suitable maps showing the detailed location for all project facilities including well sites, temporary and permanent transport systems and routes (including harbors, docks, staging and fuel storage areas, roadways, airfields, helicopter pads), communications facilities, construction camps, borrow and waste disposal areas, water supply areas and other ancillary facilities.

6.2 Construction Details

The following items should be described in concise terms:

- a) the method(s) and timing of construction for each part or phase of the proposal.
- b) the location, volumes required, and method of acquisition of local construction materials or services such as borrow site, water supply, waste water disposal, housing and any other such requirements of the proposed type of development or activity.
- c) location and other details of access roads, increased use of existing roads and other transportation facilities.
- d) location, size, duration and services of construction camps, operational camps, staging areas or airfields.
- e) interruption to natural physical processes in terms of timing and other pertinent variables.
- f) any effluents and emissions, including noise, in terms of quantity and characteristics caused or attributable to construction.
- g) the location, method of construction, dredging requirements and scheduling for any ports and marine terminals.

6.3 Operation and Maintenance

The following items should be described in concise terms where applicable:

- a) the important timing and other commissioning details of the proposal.
- b) information concerning the drilling rig and platform including such items as performance history, capacity, B.O.P. equipment and procedures, design against environmental threats (e.g. moving ice, bottom scouring by icebergs, storm surges, sub-bottom frozen materials, etc.), site position systems and/or equipment, navigation and/or communication equipment, disconnecting systems and qualifications of the drilling crew.
- c) information on support craft (air and water) with respect to environmental threats (e.g. storms, wind, wave, ice and icing conditions, etc.) navigation and communication equipment and qualification of crews.
- d) any marine seismic activities associated with the drilling program(s).
- e) any interruption to natural physical processes caused by the operation in terms of timing, space and magnitude.
- f) expected releases, or stockpiles of waste or toxic substances used or generated during all phases of the proposal. Identify all potential air, land or water contaminants and outline methods of waste disposal to avoid health hazards to humans and degradation of the environment.
- g) the quantity and quality of liquid and solid by-products of drilling activity, their storage, disposal and ultimate fate.

- h) information should be provided on water requirements from fresh or marine sources including volumes, seasonal times of extraction, treatment and disposal for domestic, camp or operational purposes.
- i) location of camps and sewage disposal systems, sewage treatment facilities, anticipated disposal rates relative to receiving waters or drainage patterns.
- j) the composition, volume and method of handling and disposal of solid wastes should be provided.
- k) the nature, transportation, storage, use, treatment and final disposition of any biocide, pipe coating materials, anti-corrosion materials, flushing agents, drilling fluids, special lubricants and other toxic substances proposed for use in the project and information on their expected persistence, mobility and ultimate fate in the surrounding environment.
- l) quantities and qualities of atmospheric emissions such as sulphur compounds, hydrocarbons, nitrogen oxides, water vapour, heavy metals, thermal emissions and any other potential pollutants produced during all phases of the project.
- m) the quantity and quality of other atmospheric emissions such as dust, noise, and odour produced by H₂S and other by-products of the proposal.
- n) where applicable changes in the use and frequency of existing transportation modes.
- o) documentation in support of all technical and operational aspects including the results of field tests under comparable operating conditions of the proposed equipment of recent origin, and parti-

cularly documentation in support of deep water (2000 ft) drilling technology.

6.4 Environmental Hazard Prediction Systems

Describe surveillance and prediction systems needed to provide adequate protection from weather, ice, and other environmental hazards, and the manner in which these will be integrated with or will incorporate observing and predicting systems of the Federal Government (Atmospheric Environment Service).

6.5 Abandonment

Plans for abandonment should include:

- a) What equipment and facilities, both on shore and offshore will be left when the project is abandoned temporarily or permanently, and how the area will be reclaimed stabilized or otherwise secured.
- b) Details for the release, loss, storage or ultimate disposal of any gaseous, liquid, or solid contaminant stored or otherwise contained in the area.

7.0 DESCRIPTION OF EXISTING ENVIRONMENT AND RESOURCE USE

A general description of the environment based on available data should be presented in Section 7.0. This information will assist the reader in understanding the general pre-development setting. It is expected that, based on a general understanding of the environment as outlined in Section 7.0 and a description of the project as outlined in Section 5.0 and 6.0, the proponent(s) will be able to list the areas of possible impact. The proponent(s) will collect further data as required in order to assess the magnitude of the impact. The environmental impact will be defined in detail in Section 8 together with the mitigation measures proposed and the

anticipated residual impact (Section 9). All pertinent data shall be included in Appendix C. If this is not feasible because of quantity, the data shall be made available separate from the EIS.

In particular Section 7.0 should describe the natural environment in the Project Area as it exists prior to Project development with emphasis being placed on those components that are of particular significance. Where knowledge gaps exist, these should be noted. A qualitative and quantitative description of present resource use should also be included. Maps of appropriate scale, graphs and charts should be included in each subsection to illustrate resource, and environmental information. Sources of information should be identified and acknowledged.

The intent of this Section is twofold. The first is to provide the context or baseline description of the natural environment in the Project Area to identify critical areas and to establish a baseline against which the effects, if any, of possible environmental impact can be measured. Secondly, emphasis should be placed on determining the extent and importance of ecological interrelationships between organisms or groups of organisms at different trophic levels. With this information, the proponent should attempt to predict how major natural or man-made changes in the environment could affect the distribution and abundance of various species or groups of species, and how those changes might affect organisms in different trophic levels. It is recognized that this integrative approach to ecology is still in its infancy so that the development of definite predictive systems models is not expected. However, the process of attempting to understand the extent and sensitivity of these ecological interrelationships will probably result in the design of more meaningful research

programs, both on the short and longer terms. The following outline of information requirements is intended as a guide to the nature, scope and level of detail, of information necessary to adequately describe the existing environment and evaluate ecological interrelationships existing there. This outline is intended to be neither restrictive nor exhaustive and the Proponent(s) will apply judgement in selecting the baseline environmental components likely to incur significant impact from the Project activities.

7.1 Climate and Sea Ice

Consider and discuss the following where applicable:

- a) mean and extreme temperatures, frequencies and durations of temperature and windchill ranges which may have significant effects on operations.
- b) wind and atmospheric stability (e.g. inversions) as they relate to the concentration and dispersion of airborne pollutants, and in combination with low temperature, to the formation of fog and ice fog.
- c) winds in terms of frequency, direction and duration of critical speeds.
- d) monthly mean and extreme precipitation and the potential for accumulation of ice or snow on structures as a result of precipitation or freezing spray, and the occurrence of air-frame icing which could significantly restrict aircraft movements.
- e) low ceilings and visibilities associated with fog, cloud, precipitation or blowing snow as factors influencing operational efficiency or emergency procedures.

- f) extreme storms relative to security of drilling systems, support craft (air or water) and on shore facilities.
- g) details of the establishment of a weather and sea-ice reporting system and its integration with relevant physical oceanographic data.
- h) the duration and adequacy of the weather information base.

7.2 Oceanography

Consider and discuss the following where applicable:

- a) spatial distribution of the mean and fluctuating components of the surface and sub-surface water velocity. Special reference should be given to the extent to which water may be expected to flow into Hudson Strait.
- b) wave climate including extreme values as they relate to structural integrity, disruption of operations, and contingency planning. (including storm surges where applicable).
- c) sea ice, including icebergs, with particular reference to the open-water season where this places limits on the time available for regular and relief-well drilling, and for effective oil-spill countermeasures; and to the occurrence of ice flows or bergs which may disrupt operations during the drilling period.
- d) location, characteristics and movement of the ice-pack. (including lead characteristics) and stresses on bottom founded structures that may be impinged upon by ice.
- e) ice scouring with particular reference to the frequency and depth of scours and the relationship between water depth and scour distribution.

7.3 Terrain

Describe the morphology and general nature of the shorelines potentially affected by oil and discuss the risk of natural seismic activity within the development area.

7.4 Flora and Fauna

Consider and discuss the following where applicable:

a) Microorganisms

- distribution and abundance of indigenous microbiota, with special reference to oleoclasts.

b) Phytoplankton (including Macrophytes)

- species composition, distribution, abundance and production on a seasonal basis.

c) Zooplankton

- species composition, distribution, abundance on a seasonal basis.

- evaluation of biomass on a seasonal and geographic basis, including an analysis of the degree of variation.

d) Benthos

- species composition, distribution and abundance in areas liable to be affected by any facet of the drilling operation, together with supporting sediment data with respect to particle size distribution and susceptibility to oil contamination.

e) Fish

- distribution and abundance of pelagic eggs and larvae.

- distribution and abundance of juveniles and adults with special reference to their coastal movements along the east coast of Baffin Island and Labrador.

- fisheries (freshwater, marine and diadromous species) with emphasis on seasonally important areas and fish densities migration behaviour, spawning requirements, and sensitivities.

f) Mammals

- population size, seasonal distribution and movements of nearshore and offshore species of seals, walrus, whales, polar bear and white fox.

- designation of areas important to any species, e.g. nursery, feeding, calving, denning, hauling-out locations.

g) Marine birds

- seasonal distribution, movements and abundance of marine bird populations in nearshore and offshore areas.

- location and population estimates of seabird colonies.

- identification of environmental features affecting the timing of nesting and migration of the various species of marine birds in the region.

- identification of nesting and breeding areas for water fowl.

h) Sensitive Species

- the identification of any species which may be sensitive to the proposed development and that act as important food resources for other co-habiting species.

- identification of species that may be considered rare or endangered, or important for subsistance, scientific commercial or recreational use.

i) Historic Trends

- Historic trends in the use of the area by animal populations, including those of direct and indirect importance as well as those which may be dangerous to man.

j) Biological Systems

- predevelopment levels of potential environmental contaminants in the physical environment, and in selected indicator species.
- the capacity of biological systems to assimilate pollutants which may result from the proposed development or activity.

7.5 People

Consider and discuss the following where applicable; in relation to the environmental setting of the project;

- a) the distribution and characteristics of the human population including such aspects as traditional life styles, communities, employment, public facilities and housing.
- b) cultural, social and economic setting of the region with recognition of resource use and the natural environment;
- c) the expected population changes or redistribution resulting from the proposed development.

7.6 Resource Use

Consider and discuss the following where applicable:

- a) characteristics of the human population dependent on the resources of the area to be affected;
- b) existing resource use in the area of, and influenced by, the proposed development and associated projects, with an identification of historic and current native hunting and fishing locations.
- c) areas of special status such as ecological reserves, sanctuaries, native land reserves, villages, fishing stations, hunting and gathering areas, areas of archeological, historic or paleontological significance and areas of religious or cultural importance;

- d) existing or potential recreational and subsistence use of land and resources;

8.0 ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

This section should describe the impact of the project on the existing environment in the broad context and upon the ecological interrelationships between the major species or groups of species at different trophic levels, either direct or indirect, harmful or beneficial, with emphasis on those actions likely to cause major ecological disruptions. All potential environmental impacts should be considered and discussed in terms of the headings identified in Section 7.0 and other factors considered pertinent. A summary including all the concerns identified as well as the options and measures available to alleviate these concerns should be presented; The summary should also identify those environmental impacts considered to be major.

8.1 General

The following items should be discussed:

- a) the analysis used to define impacts.
- b) changes in fish and/or wildlife habitat;
- c) alterations of water quality and water regimes including their effects on habitat of fish and wildlife;
- d) interference with fish and wildlife populations and the effect this interference may have on the use of these populations by man;
- e) land use changes;
- f) river or lake crossings that would lead to slope failures, gully erosion and related disturbances;
- g) sites judged to be of archaeological or historical significance that require protection through ordinance or by some other means.

- h) critical information deficiencies and where such deficiencies have affected the prediction of environmental impact.
- i) terms of reference for future studies to obtain the information necessary to complete the assessment.
- j) potential environmental impacts in terms of existing ecological relationships, in relation to international, national, regional, local or site-specific interests.
- k) options and measures that may be implemented to avoid, minimize, or mitigate harmful effects and to enhance beneficial effects.
- l) plans for surveillance and monitoring of environmental effects.
- m) those impacts identified as major.
- n) those impacts directly affecting the social fabric of the area.
- o) any other items considered important.

3.2 Contingency Plans and Countermeasures

Following a general introduction and definition of the geographic area where the plan will operate contingency planning is to be discussed in two phases:

1. Risk Analysis - In the event of a blowout estimate the type and flow rate and duration of gas and oil likely to be released.
Include a discussion of the risks associated with the project and areas considered sensitive to oil pollution. Also estimate the probability of spills of various sizes.
2. The risk analysis outlined above should be used to:
 - a) describe and estimate the effectiveness of any countermeasures that may be undertaken to control oil on the sea surface.

- b) discuss the capability and logistics of drilling a relief well (include the availability of alternate deepwater drilling systems where necessary) and alternatives to relief well.
- c) discuss the threat of pack ice and icebergs, and severe storms to the drilling systems and describe the countermeasures and dangers involved. A clear statement of the procedures, minimum advance warning times and time for reconnection before drilling can resume should be included in this section.
- d) present a model to predict the trajectory and dispersion of oil on the surface of the ocean using mean and fluctuation (tidal currents) surface water and wind velocities as input parameters and taking account of the presence of sea ice where applicable. Define the limits of the parameters over which the model is considered useful, and the data basis used for defining and testing the model.
- e) describe the organization and logistics required to track, contain and clean up an oil spill. Include:
 - notification procedures and chain of command.
 - roles and responsibilities of industry and government personnel including government responsibility centers and established reporting procedures.
 - interface with existing or proposed contingency plans (national and international).
 - personnel and equipment requirements (provide an inventory and location for the necessary communication, containment, cleanup and disposal equipment).

- time required for effective action.
- methods of estimating the trajectory and dispersion of the gas in the atmosphere in the case of sour gas.
- f) discuss the behaviour of gas and oil escaping from a blow out at the bottom of the sea. Include in the discussion:
 - estimates of how much gas and oil might remain on the seafloor or in the water column through dissolution or change of state.
 - methods of estimating the trajectory and dispersion of the gas and oil while in the water column.
 - ultimate fate of the oil, including times for biodegradation, or other disposition.
- g) discuss the threat of a major fire on the drilling platform and describe the fire fighting techniques.
- h) describe the training program for field personnel and proposed oil spill exercises.

9.0 RESIDUAL IMPACTS

The environmental impacts that remain after all practical mitigating measures have been incorporated into the proposals should be discussed in terms of the nature, extent and duration of all such impacts on the environment and the implications, to international, national, regional, local and site-specific interests. Include in this discussion a prediction of expected effects from a clean-up operation should an oil spill occur.

10.0 APPENDICES

The appendices should include lists of references cited, lists of reports prepared in support of the assessment, lists of field data used to describe the environment and to undertake the impacts. All information

must be made available to the Panel upon request. Additional copies of the material must be made available for public perusal at locations to be determined.



